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CENTRAL INTELLIGENCE AGENCY
WASHINGTON 25, D. C.

IRONBARK

30 NOV 1962

MEMORANDUM FOR: The Director of Central Intelligence

SUBJECT : MILITARY THOUGHT (SECRET): "Engineer Support of the Operations of Missile Large Units and Units in Offensive Operations"

1. Enclosed is a verbatim translation of an article from the SECRET Collection of Articles of the Journal "Military Thought" published by the Ministry of Defense, USSR, and distributed down to the level of division commander.

2. For convenience of reference by USIB agencies, the codeword IRONBARK has been assigned to this series of TOP SECRET CSDB reports containing documentary Soviet material. The word IRONBARK is classified CONFIDENTIAL and is to be used only among persons authorized to read and handle this material.

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APPROVED FOR RELEASE
DATE: DEC 2004

Richard Helms
Deputy Director (Plans)

Enclosure

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Original: The Director of Central Intelligence

cc: The Director of Intelligence and Research,
Department of State

The Director, Defense Intelligence Agency

The Director for Intelligence,
The Joint Staff

The Assistant Chief of Staff for Intelligence,
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The Director of Naval Intelligence
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COUNTRY : USSR

SUBJECT : MILITARY THOUGHT (SECRET): "Engineer Support of the Operations of Missile Large Units and Units in Offensive Operations".

DATE OF INFO : Mid - 1962

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Following is a verbatim translation of an article entitled "Engineer Support of the Operations of Missile Large Units and Units in Offensive Operations", written by Major-General of the Artillery L. Blagorazumov, Engineer-Colonel V. Kazin, Major-General of the Engineer Troops D. Zabolotskiy, Lt. Colonel V. Gavrilin, Colonel Ye. Kolibernov, Lt. Colonel V. Dimura, Captain L. Yefimochkin, Lt. Colonel V. Andreyev, and Lt. Colonel P. Ryumin. It appeared in Issue 3 (64) of 1962 of a special version of the Soviet journal Military Thought which is classified SECRET by the Soviets and is published irregularly. Issue 3 (64) of 1962 was probably sent to press in May or June of 1962.

[redacted]'s Comment: Military Thought is published by the USSR Ministry of Defense in three versions, classified RESTRICTED, SECRET, and TOP SECRET. The RESTRICTED version has been issued monthly since 1937, while the other two versions are issued irregularly. The TOP SECRET version was initiated in early 1960. By the end of 1961, 61 issues of the SECRET version had been published, 6 of them during 1961.

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COMMENTS ON PREVIOUS ARTICLES

Engineer Support of the Operations of Missile Large Units and Units in Offensive Operations

A very important factor in the resolution of a number of problems in the engineer support of combat operations of missile large units and units and of units of antiair and antimissile defense of the ground troops, especially of antiaircraft guided missiles, is the composition and grouping of these large units and units. Both of these arms of troops represent numerous large units and units, armed with very complex combat equipment. Despite the zonal system of covering front troops, antiaircraft missile units are used not only for the creation of zones (lines) of antiair defense, but simultaneously, also, for the direct cover of the most important objectives from air strikes, which in the zone of the front are, of course, the missile troops. Therefore the combat formations of antiaircraft missile units will very often be superimposed on the combat formations of large units and units of operational-tactical missiles.

Thus, under modern conditions very characteristic groupings of ground and antiaircraft missile means are created in an army and front and will be located in common siting areas in their initial position; and during an offensive operation they will often shift simultaneously and locate jointly in new siting areas.

In connection with these characteristics, let us examine the presently accepted view on how the tasks of engineer support of missile troops and PVO troops of the ground troops in an offensive operation are to be distributed between the engineer troops of the

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front and armies on the one hand and the missile troops and PVO troops on the other (from the experience of a large number of military games and troop exercises that were carried out during the last few years).

Thus, the engineer units of the armies and of the front are assigned the following tasks in support of the missile troops and PVO troops: engineer preparation of concentration areas; preparation of routes for regroupings and maneuvering outside the siting areas; ensuring of crossings over water barriers; mine clearing in siting areas and laying of mines in the approaches to them; the stockpiling of timber and prefabricated structures, the execution of engineer measures for operational camouflage (setting up dummy siting areas); and obtaining water and supplying water to missile troops.

Missile and antiaircraft missile units and large units use their organic forces and forces of attached engineer subunits to carry out independently such work as: the fortification preparation of main, alternate and temporary siting areas; the preparation of routes within these areas; the direct engineer support of the march; the camouflaging of positions, structures and combat equipment; and engineer measures for removing the results of enemy nuclear strikes in the siting areas.

It would be possible to agree with this typical distribution of tasks if there were a higher degree of maneuver capabilities and of efficiency of the engineer equipment which is available in the missile large units or which is attached to them and to the antiaircraft missile units. The modern means of engineer equipment permit the satisfactory execution of the engineer tasks listed above only when preparing for an operation. During an offensive operation a number of difficulties are encountered in the fulfilment of these tasks.

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When preparing for an operation the most important and most labor-consuming engineer support task assigned to the missile troops is the engineer preparation of their siting areas. All the remaining tasks are subordinate to this main task or are performed by the engineer troops of the army (front) in the overall engineer preparation plan of the operation. Calculations show that, if a missile large unit has all its organic engineer equipment and if an antiaircraft missile unit is reinforced with one engineer-siting company, all the engineer tasks in the siting areas can be performed within tactically expedient time limits.

During an offensive operation the principal engineer task will be to support the timely transfer of missile units and PVO troop units to new siting areas. This task will include the support of the march, reconnaissance, and mine clearing and the engineer preparation of new areas.

According to modern views, the engineer preparations for the shifting of troops should be participated in by various engineer units and subunits of the army (front) designated to prepare basic routes and to carry out engineer reconnaissance and mine clearing; and by subunits assigned to prepare new siting areas for those missile units which for some reason do not have organic engineer forces and means. Besides this, some of the tasks will be performed by the organic sapper companies found in the missile troops.

The chief of the engineer troops of the front (army) is virtually deprived of the opportunity to control all these units and subunits and to coordinate their actions, because they are all subordinate to various authorities--to the chief of the engineer troops, to the chief of the missile troops and artillery, and to the chief of PVO troops.

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Such an organization of the engineer support of the shifting of missile and antiaircraft missile troops inevitably leads to the inefficient utilization of a large number of engineer forces and equipment allotted for this purpose: in some cases they remain idle, and in others they are forced to perform tasks that are not within their capability. The maneuver of engineer subunits which are under the command of different chiefs is extremely complex.

In our view, the existing organization of the engineer support for moving groupings of missile troops and PVO troops of the ground troops in an offensive operation cannot be called efficient.

It should be noted that there is no organic engineer service in antiaircraft missile units. The existing partially attachable bulldozer equipment on prime movers cannot be used effectively during an operation, because the prime movers cannot be sent to new siting areas separately without the launching mounts that they tow.

The engineer equipment that is being planned for sapper companies for use in the support of missile large units of operational-tactical designation is not very well suited for carrying out work during an operation.

The experience of a number of exercises shows that the combat and special equipment of operational-tactical missiles must definitely possess equal capabilities for good tactical roadability over poor roads and over terrain without roads, as well as for good operational mobility that would enable it to be moved under its own power over great distances. The latter requirement is especially important for the conditions in the initial period of a war.

Thus, it can be pointed out that during an exercise in August 1961 a missile large unit carried

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out a 1450 km move over hard-surface roads in a short period of time, after which it was deployed in the siting area and prepared for the launching of missiles. In this case, the launching mounts were moved on heavy trailers pulled by heavy wheeled KRAZ-219 prime movers. During the exercise the latter lagged at least 3 to 4 hours behind the wheeled vehicles during one move (200 to 250 km), and were only able to cross bridges with a load capacity of 70 tons and under underpasses that were not less than 4.5 meters in height. In those areas where the roads were in poor condition it was necessary to remove the launching mounts from the trailers and to let them pass separately. It should be mentioned that 40 to 50 minutes were expended in removing and loading the mounts and in camouflaging them with the cover.

Thus, the experience of this exercise showed that missile combat equipment with tracked running gear possesses low operational mobility, and the use of heavy trailers for moving it reduces its maneuver capability under poor road conditions (low tactical mobility). Apparently these considerations are taken into account when developing missile troop equipment, because it is known that in the near future the launching mounts for operational-tactical and antiaircraft missiles will have a wheeled 4-axle chassis with high roadability. Launching mounts of this type are already being issued to missile troops and are proving themselves favorably.

In light of this, it is difficult to understand the striving to introduce fifteen heavy tracked excavating machines on the chassis of heavy artillery prime movers (seven BAT and eight MDK) into the T/O & E of an engineer company. These tracked machines of auxiliary designation will not help increase the maneuverability of the missile troops.

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At the present time there are no machines for digging trenches (MDK) in the troops. Apparently they will appear in sufficient numbers at the same time that the rearmament of missile troops with new wheeled launching mounts is completed. By this time, the MDK, despite its high efficiency, will prove to be unsuitable for missile troops and PVO units because of the marked difference between it and the potential maneuver capabilities of these troops. The same must be said about the bulldozer-roadbuilder (BAT) on the chassis of the ATT prime mover. Evidently, these vehicles will lag behind the missile troops during a march, especially behind the reconnaissance groups, and consequently will not be able to perform their tasks of engineer support during an operation.

There can be objections that in a combat situation engineer vehicles must move under their own power and will not be transported on heavy trailers. Such a posture is permissible, but, at the same time, it is necessary to take into account the limitations of the motor transportation potential of tracked vehicles and their low speed of march.

It is evident that after a tracked vehicle of the MDK type has completed a run of 500 to 600 km over hard-surface roads, it will not be able to carry out earth work successfully without first conducting quite complex and prolonged technical inspections and repairs, not to mention the fact that it will arrive at its destination 5 to 6 hours late, and consequently be of little use.

The above-mentioned factors allow the conclusion to be made that the T/O & E of engineer subunits of missile troops and PVO troops must contain engineer vehicles which are wheeled, and not tracked, and which have maneuver capabilities corresponding to the mobility of the units they are supporting. Until this is done, the organic engineer subunits of missile

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troops will not be able to provide the effective support required of them in a battle or an operation.

It is most expedient to build such engineer machines on the chassis of wheeled prime movers: the MAZ-538 of the Minsk Automobile Plant and the T-90 of the Kharkov Tractor Plant. These prime movers have, respectively, a gross weight of 18 and 5 tons, engines with 360 to 85 hp, and 8 and 4 drive wheels, and they can develop a transport speed of up to 40 and 32.5 km/hour. The cab of each vehicle is sealed and has heating and ventilation.

The design of both prime movers provides for the capability of attaching the most diverse working equipment, which will permit the use of one basic vehicle for carrying out various engineer tasks, and thereby reducing the number of engineer vehicles.

It is quite likely that our industry will come up with still other basic vehicles with more improved tactical-technical capabilities for attaching engineer equipment.[1]

In view of the existing organization of the engineer service in the missile troops and in view of the availability of modern means of engineer equipment, it is most advisable to carry out the engineer support of missile and PVO troops of the ground troops in offensive operations by organizing special operational engineer groups in the armies and in the front for this purpose and to place the chief of the engineer troops of the army (front)

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[1] For example the press reports the creation of a wheeled tractor-prime mover K-700 at the Plant in Kirov in Leningrad, with a 220 hp engine and a transport speed of 40 km/hour.

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in control of their operations.

Such operational engineer groups should be created on the basis of the number of units of missile troops and PVO troops located in common siting areas and carrying out joint moves. Each operational engineer group must be divided into subgroups according to the number of routes for moving and the number of new siting areas adjacent to them.

The composition of operational engineer groups can vary (from a company to a battalion of engineer troops) and will depend on the nature of the terrain and on the nature of the expected conditions of the move. In this case, the organic sapper companies of the missile troops should be included in the composition of these groups, especially after they complete the work of preparing the siting areas in the initial position.

The presence of an operational engineer group headed by an experienced and competent engineer officer permits the reliable and timely move of a grouping of ground and antiaircraft missile units during an offensive operation according to the principle "from position to position." The chief of the engineer troops will be able to have uninterrupted control over the operations of engineer groups subordinate to him and to carry out a maneuver with the forces and means assigned to these groups; and, therefore, he will be able to have actual, not nominal, responsibility for the engineer support of missile troops and PVO troops of the ground troops.

In order to ensure the successful work of the operational engineer groups, the staff of the front (army) must inform the chief of the engineer troops of the sequence and time limits for moving missile and missile-technical units and units of the PVO troops, the routes assigned for them, the new siting areas and the time they are to be occupied. Subsequently,

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the chief of the missile troops and artillery (chief of the PVO troops) must maintain continuous communications with the chief of the engineer troops and inform him of all changes in the decisions that were made earlier. The chief of the engineer troops creates an operational engineer group, assigns the task to its commander, and provides him with the necessary initial data.

The transport means and engineer equipment assigned to the operational engineer group must ensure its successful work under any, even the most difficult, conditions. In order to achieve the necessary leadership efficiency, especially when the group is working on two separate axes, the commanding officer must have an MI-1 type helicopter. Among the basic engineer equipment that an operational engineer group must have are highly efficient excavating machines, bulldozer-roadbuilders, bridge-laying tanks, minesweepers, road mine detectors, and transport vehicles for transporting sets of shelters and of road-bridge structures.

The commanding officer of the operational engineer group may break up the group into siting and road subgroups, in accordance with the task that he has received. The siting subgroups are moved out directly behind the forward detachments; and on territory that has been taken from the enemy and designated as new siting areas, they immediately begin engineer reconnaissance, mine clearing, and, upon completion of engineer reconnaissance, engineer preparations. The road subgroups must reconstruct (construct) routes necessary for moving missile and antiaircraft missile units, keep them in usable condition, and carry out direct engineer support of the march.

Of course, the tactics, composition, equipment and outfitting of such operational engineer groups must be subjected to thorough theoretical development and checking during troop exercises.

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We do not pretend to have made a comprehensive presentation of the problems of their combat employment. However, it is completely evident that the more complex the conditions become for moving missile units and units of the PVO troops during an operation, the less suitable will the modern methods of carrying out the engineer support of such moves become.

The new arms of troops--antiaircraft missile troops and missile troops of operational-tactical designation--urgently demand a creative approach to the organization of their engineer support in an operation.

Major General of the Artillery
L. Blagorazumov

Engineer Colonel
V. Kazin

* * *

The basic tasks of engineer support of missile troop operations in a front offensive operation are the preparation of a network of roads for moving missile units and large units, preparation of fortifications of their siting areas and missile base areas, and the execution of camouflage measures.

It seems to us that it is advisable to distribute the tasks of preparing a network of roads in the following manner: routes of missile unit maneuver, as the most complex and labor consuming type of work, should be prepared by the forces and means of the front (army) engineer troops; roads for the delivery of missile ammunition should be prepared and maintained by the forces and means of the road units of the front rear services; and routes within the siting areas and displacement areas should be prepared by engineer subunits of the missile units.

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A similar solution does not exclude the possibility of using engineer troops of the front and army for preparing supply routes and routes within the siting areas; and road units of the rear services for preparing maneuver routes, if the latter coincide with the rear services' roads. The broad employment of road units of the rear services for preparing maneuver routes for missile troops may have a place in the initial period of the war when, as a rule, the number of engineer troops in the front (army) will be limited.

Routes for moving missile large units and units should be selected jointly by the staffs of the missile troops and artillery and of the engineer troops, and, if necessary, also by the staff of the rear services. During an operation, there must be constant cooperation among these staffs. Independent routes must be assigned to each missile unit and large unit, and special subunits, from engineer-road companies up through engineer-road battalions, must be allotted to prepare these routes.

Analysis shows that the most difficult move to support is that of missile large units and units during an operation at the army level. In order to afford the missile troops the necessary time to reconnoiter, tie in, equip, and occupy new siting areas, road work must be carried out directly behind the forward advance of the divisions of the first echelon, with a route construction pace of 8 to 10 km/hour. Taking into consideration the great frequency of subsequent moves of missile subunits, antiaircraft cover units, engineer-sapper subunits and missile transport subunits, it is necessary to prepare an independent route for the missile large unit in the zone of the army that must be closed to the passage of other troop units and freight to a depth of up to 100 km. The commanding officer of the engineer-road unit assigned for the preparation of the given route must establish close contact with the commanding officer of the missile large unit.

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There will be a little more time for preparing routes at the front level. In the intervals between moves of missile subunits, other troop units can be moved over these routes.

The direction, the nature of the preparation, and the maintenance of the road network for delivering missile warheads to the siting areas, and also for moving the mobile repair-technical base (podvizhnaya remontno-tekhnicheskaya baza--PRTB) of the missile large units and the PRTB of the antiaircraft missile units, must be coordinated with the chief of the engineer troops in order to make maximum use of the roads already prepared.

When preparing a road net within the siting areas and deployment areas of missile large units, missile units and missile bases, it is essential to make broad use of existing roads, paths, forest lanes, and sectors of the terrain that are suitable for short-term traffic. They must be prepared with organic forces somewhat in advance, or at the same time that the fortification preparation of these areas is begun.

The total extent of the roads in the siting area of a missile unit may be 30 to 35 km, of which approximately half are exit routes for launching assemblies to launching sites. The preparation of these routes will consist of selecting them, checking them for mines, and making the simplest preparation for the movement of single vehicles. The supply routes must be equipped for the movement of large-dimension wheeled vehicles at nighttime. By using existing roads and laying only 25 percent of the necessary amount of roads, with the exception of setting up bridge crossings, an engineer-sapper platoon can perform these jobs in 2 to 2.5 hours.

In the deployment area of the PRTB, the entire road net for moving wheeled vehicles at distances

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up to 80 km can be prepared by an engineer-sapper company in 3 to 4 hours.

Taking into consideration the limited time for preparing a network of roads, and also its short-term use in one area, it is necessary to endeavor in every possible way to employ prefabricated road and bridge structures. In our opinion, this will require that missile units have organic means for overcoming narrow obstacles: a bridgelaying tank (MTU) in an engineer platoon, and a heavy treadway bridge (TMM) in an engineer company. Such a need is attested to by the experience of troop exercises.

The main task in carrying out the fortification of siting areas and disposition areas of missile troops is to ensure the protection of personnel and combat equipment from weapons of mass destruction. It includes shelters for personnel, equipment and materiel, engineer structures for control points, water supply points, trenches for defense, and other structures. With the goal of increasing the concealment of siting areas, the nature of the preparation of the siting areas must be similar to the preparation of troop positions or areas occupied by units of other arms of troops.

Taking into consideration the special importance of missile troops, it is advisable to provide them with a relatively greater number of sets of the most durable covers and shelters than are given other units, and also to erect separate special structures for them to protect the expensive materiel of the sets with which the troops are supplied. However, it is unrealistic to count on the employment of special structures and highly durable materials at the present time, besides which all this may appear as a revealing sign.

The correct selection of siting areas for missile units and of disposition areas for missile-technical

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bases has a great influence on the nature of fortification preparation. In this case, a paramount role will undoubtedly be played by the operational-tactical requirements for the creation of the necessary grouping of missile troops to carry out the tasks in an operation. In our opinion it is advisable to select one of the alternate siting areas at a distance of 30 to 50 km in front of the primary one, and the other one at the same distance behind it.

In selecting a siting area, the basic engineer requirement is the availability of natural cover that will permit engineer work to be carried out and favorable hydrogeological conditions that will permit the digging of trenches 2 to 3 meters deep.

The presently accepted principle, according to which each missile large unit, unit or base must have the necessary engineer forces and means for the independent preparation of siting areas and disposition areas, is, in our opinion, completely correct. This will permit the necessary work to be done properly and in a timely manner while preserving the secrecy of the work.

Moreover, under conditions of a nuclear/missile war, when missile large units and units will be employed in mass numbers, the chief of the engineer troops of the front (army) will be practically unable to supervise the preparation of such a large number of siting areas directly.

The autonomy of missile large units, units and installations in the engineer preparation of areas can be realistically ensured at the present time by alloting to them the necessary number of highly efficient engineer machines.

In the preparation of siting areas, earthwork is the most voluminous and labor consuming and the

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readiness of the areas depends on the time taken in carrying it out. However, as practice shows, the complete readiness of areas as a whole requires approximately an equal amount of time for preparing the road network, for erecting and equipping shelters, for camouflage work, and for checking the area for mines.

Calculations show that the time allotted for preparing siting areas will depend on the number of moves planned for missile large units and units. Thus, in the event of a move of missile units at the army level on the average of once every day, 7 to 10 hours can be allotted for preparing each siting area of a missile unit, during which time it is only possible to carry out first-line work. If a missile large unit of the front level is moved on an average of every second day, then the time it takes to prepare the siting areas would be 12 to 18 hours, which permits the fulfilment of all the basic engineer work. In the first case the simultaneous preparation of one siting area with the forces of two organic engineer-sapper platoons is excluded, while in the second case there is an opportunity to call in these platoons for subsequent preparation of the positions.

The present time limits for preparing antiaircraft missile unit positions and equipping the disposition area of the PRTB are, in our opinion, unacceptable. This should be reduced by two or three times. To achieve this, the sapper platoon in an antiaircraft missile unit must be expanded to a company made up of two platoons, and a PRTB should have an engineer-sapper company with the same organization as in missile large units.

The capabilities of missile troops to prepare, independently, areas occupied by them does not exclude, in case of need, the calling in of engineer units of the front and army for these purposes. The latter

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can be assigned the tasks of mine clearing, of preparing alternate siting areas, of preparing prefabricated structures and other work.

We consider it appropriate to support the statement of Engineer Colonel B. Mikhaylov, who proposed changes and improvements in the designs of models of missile equipment and auxiliary equipment for the purpose of further increasing the degree of missile troop protection.*

In our opinion, such a statement of the question is conditioned by the fact that the problems of protection clearly occupied a secondary place during the creation of missile troop materiel, and it is impossible to resolve them now only with the forces of the engineer troops.

Let us examine this with examples. One of the most important tasks in the protection of missile units is the ensuring of missile safekeeping. However when it is in its transport position on ground carriers, and even when on the launching assembly, the missile can be put out of commission by a bullet hole. When the missile is located on carriers in dugout shelters, only the running gear of the carrier is actually protected, while the missile itself, located at a height of 1.6 m, is protected very poorly. The solution suggests itself, to transport the missiles in special armored containers (carriers), with frames that lower to the ground, and to equip the launching assemblies with armored shields which will sharply reduce the vulnerability of missiles and will simultaneously reduce the volume of earthwork when excavating shelters.

In our opinion, missiles can be stored very effectively in vertical shafts dug by the explosive

* Collection of Articles of the Journal "Military Thought", No. 6 (61) 1961.

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method with the aid of an elongated charge. The hole for the charge is made with a boring machine of the AVB-3-100 or BKGM-AN type. A shaft with a small diameter, after the simplest finishing of the walls, and with a simple portable cover, can ensure a very high degree of protection (up to 10 kg/cm^2), even at ground zero of an air burst of a nuclear warhead of any yield. However, from the design standpoint, this method has not yet been resolved.

The technological process presently accepted for preparing missiles makes it necessary to create structures at the most vital parts of the cycle that have a significantly lower degree of protection than conventional dugout shelters. Thus, the checkout point, at which the missile is located for 4 hours, is in a tent that is approximately 21 x 6 m. The digging in of the tent into an appropriate dugout cannot increase its protection substantially. The tent can be destroyed with a pressure of a shock-wave front equal to 0.10 to 0.15 kg/cm^2. On the other hand, the erection of a covered structure for the checkout point with a span of up to 5 m can be a very complex and labor-consuming matter. If we do away with the carrier and create a special device for delivering missiles, similar to the one proposed by Engineer Colonel B. Mikhaylov, then this important structure can be located in a dugout or KVS-A* type underground structure that has been adopted by the army for supply and that has a span of 2.2 meters (the diameter of the missiles is 0.9 meters). Even in the trench version this will ensure protection at a distance of 400 meters from ground zero of the air burst of a nominal nuclear charge.

The second important installation--the missile fueling and mating point--is located in four shelters that have impermissibly narrow earthen bulkheads between them (1 to 1.5 m). The protective characteristics of such a shelter cannot stand up to criticism. It is difficult to preserve it even

/*corrugated steel/

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without any shock effect. At the present time, it is impossible to change the joint location of the shelters and to disperse them, because of the insufficient length of the special hoses that supply the fuel components.

Other similar examples could be listed, but it is already clearly visible from the ones given that further work is necessary on the improvement of the protection of missile troops by erecting strong field engineer structures in short periods of time and in mass quantities, and by design changes in the individual models of missile equipment.

Under modern conditions the missile troops are the most important targets, for the detection of which the enemy will direct all his reconnaissance means. Therefore, it is of paramount importance to carry out measures for their concealment. It is not possible to perform this task only by camouflaging the areas occupied by them. We consider that this goal will be achieved only by thoroughly camouflaging locations, preparation of new siting areas, and moves of real operations, and by setting up dummy operations of missile large units, units and installations.*

The execution of engineer works for the preparation of siting areas, simultaneously with the execution of camouflage measures and work for the preparation of troop positions, which are conducted on a broad front and to a great depth, cannot serve as an important revealing sign for the disposition of missile units.

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* Some problems of the camouflage of missile troops were brought to light by Colonel K. Lapshin in the journal "Military Thought" No. 5 (60), 1961. /sic, no such article appeared in that issue./

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The concealment of missile troop movements can be greatly facilitated by moving them preferably during the hours of darkness, with strict observance of blackout requirements, and during daylight hours by employing camouflage frames that change the shape of the most characteristic parts of missile armament (launching assemblies, ground carriers, saddle cranes, etc.).

The concealment of the activity of missile units themselves is a more complex problem: the movement of launching assemblies and ground carriers, the presence of a large number of special motor vehicles in one area, and the periodic release of radiosondes from meteorological stations.

The camouflage of missile equipment must be conducted by the crews with the help of issued and improvised materials. Each vehicle and assembly must always have sets of camouflage equipment which are appropriate for the conditions of the terrain and must install them immediately after arriving in the area.

In connection with this, delays in resolving the problem of creating effective camouflage sets for launching assemblies, saddle cranes, ground carriers, and other specific vehicles of the missile troops will not be tolerated. Various camouflage devices and frames that alter the shape of these vehicles can be quite effective, especially on the march.

The presently accepted uniform painting of equipment a green color does not fully satisfy camouflage requirements. The periodic painting of combat equipment with colors that best correspond with the background of the terrain should be widely adopted. A good effect can be achieved through the skilful use of paint to alter the shape of equipment and, in some cases, to change its appearance temporarily. The painting must be carried out by the forces of the engineer-sapper subunits of missile units, for which

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purpose it is necessary to furnish them with the appropriate equipment (mobile paint shops, paint kits, etc.).

The staffs of missile units must exercise constant control over the observance of camouflage measures for siting areas through the use of aerial photography and, also, periodic checks by helicopters.

Operational camouflage will help greatly. Its basic method must be the simulation of missile unit actions. Simulation should be carried out by subunits specially allotted for this purpose, and supplied with remote-controlled mock-ups of the basic types of combat missile equipment, transport with a high degree of roadability, means of radio communications, and the necessary supplies for independent operations.

During exercises, attempts to simulate individual positions with the forces of the missile large units did not give positive results. These large units are not able to allot the necessary forces and means for the simulation of missile unit operations, and the two available mock-ups of launching assemblies will not perform this important task. Missile units cannot select areas for simulation independently without subjecting other important objectives to possible destruction. The designation of dummy areas by the higher headquarters and the allotment of the necessary forces and means for simulation to the missile units do not solve the problem either.

We therefore feel that missile large units and units must be relieved of the execution of all simulation activities. This task should be performed by the forces of the front and army according to a single plan for operational camouflage.

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In this respect, the operational exercise conducted in 1961 gave positive experience. During this exercise, groups, each in the form of a sapper and road platoon, were realistically created for simulating the activity of three missile units, four launching assemblies (mounted on amphibious armored carriers, two radio sets on GAZ-69 motor vehicles, and eight ZIL-151 trucks with covered bodies. Each group had a mock-up of a SON-9 radar set with equipment for releasing radiosondes.

These groups were provided with gasoline supply vehicles, kitchens, tents, electric power stations, and with all the necessary supplies for the independent simulation of missile troop operations. Technical direction was carried out by officers from missile units, and the overall direction by the operations group of the front staff in accordance with the plan for operational camouflage.

The tactics of the simulation group were similar to those of missile units; but when on the march and when assuming siting areas, breaches of camouflage were permitted intentionally, not crude, ostentatious ones but only those that accentuated the revealing signs of missile troops. For example, camouflage devices on the mock-ups of launching assemblies stood out somewhat against the background of the terrain, the camouflage was carried out carelessly, and the movement of separate vehicles was permitted.

In our opinion similar simulation subunits should also be assigned to prepare obviously false siting areas. In this case double simulation is created. Thus, the enemy reconnaissance, having discovered a clearly false siting area, is more likely to accept those set up by the simulation subunits as the actual siting areas.

The experience of exercises has also shown the need to create manufactured models of missile armament

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mock-ups with remote control. The expenditures for material in creating similar mock-ups will undoubtedly prove to be justified, first of all with its combat effect of safeguarding of real missile units.

Despite the short time that simulated subunits were used, even during exercises where reconnaissance capabilities are limited, the majority of the simulated siting areas attracted the attention of the "enemy" and nuclear strikes were delivered against them. This makes possible the conclusion that operational camouflage measures are an effective means that aid in the concealment of missile units and must be widely used in all types of combat operations.

Major-General of the Engineer Troops
D. Zabolotskiy

Lt. Colonel V. Gavrilin

* * *

The engineer support of crossings by large missile units and units over water barriers can decisively influence the success of a battle or operation. However, in the military press these questions are still poorly elucidated, and the suggestions given in some articles on the organization of crossings are at times even erroneous.

In our opinion it is impossible to agree with the recommendations of the military-scientific conference of the Kiev Military District, which consider it possible for one missile large unit to make a crossing in one echelon during an operation in 2 to 2.5 hours.* With this method of crossing, fire inactivity of all units of the large unit is

* Collection of Articles of the Journal "Military Thought", No. 5 (60), 1961

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unavoidable for a significant period of time. Colonel A. Lebedev is also in error in his article when he proposes that missile units make crossings on tracked self-propelled ferries (gusenichnyy samokhodnyy parom--GSP).* It is completely obvious that of all the missile equipment only launching mounts on ISU-152 chassis can be taken across in this manner. Saddle cranes, ground carriers and other large-sized equipment do not fit on the GSP.

The experience of exercises permits the formulation of some principles and calculations pertaining to the organization of crossings by missile large units and units.

Missile large units and units will cross broad water barriers more frequently on ferries and [redacted] landing means, and less frequently over bridges.

In the latter case the organization of the crossing does not present any particular difficulties. When planning, it is only necessary to determine the exact time limits and the sequence of missile unit crossings and then to allot independent approach routes to the bridge. The straight sections of the approach roads to the bridge (pier) must be at least 35 to 40m, in order to ensure the free movement of extra-long equipment which has a large turning radius. In planning the time of a crossing it should be taken into account that, for example, the rate of speed of a saddle crane over a bridge supplied by the heavy pontoon park (tyazhelyy pontonnyy park-TPP) does not exceed 3 to 4 km/hr, because the width of the rear wheel running gear of the saddle crane is limited in relation to the width of the roadway of the bridge.

Crossings by missile large units and units on ferries and [redacted] landing means have a number of peculiarities in comparison with crossings by other arms of troops. This is explained by the presence

* Collection of Articles of the Journal "Military News", No. 38, 1961, page 54.

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of extra-long equipment for which the use of [redacted] landing means is limited; by the need simultaneously to take to the opposite bank, a missile unit in a complex capable of ensuring the preparation and launching of a missile; by the difficulty of taking across by ferry, in one trip and in one sector, various special vehicles, in order to avoid having several missile unit vehicles of one type put out of commission by an enemy nuclear strike; and by the advisability of taking missile troops across mainly at night.

In our opinion the following method for organizing a crossing is the most acceptable. A missile large unit of operational-tactical missiles will be taken across rivers 400 to 1000 m. wide on organic crossing means.

After the troops capture a bridgehead on the opposite bank, and right after the first echelon regiments or after the division artillery is sent across, but not before the selected siting area is occupied, reconnaissance groups and engineer-sapper subunits for tying in and preparing the siting areas are sent across first.

In order to send across the reconnaissance groups (one each from the command of the large unit and the technical battery, and two from the missile units) and sapper subunits, it is necessary to allot means to provide 15 ferry trips of GSP or TPP (for road-builders and excavators), 13 K-61 trips (for passenger cars and trucks), and 4 trips by ferries with a large surface area and a capacity of 50 tons provided by the TPP (for trucks and special vehicles). It is not necessary to allot separate sectors for their crossings.

For the main forces of a missile large unit it is advisable to allot crossing sectors that are separate from the troops. It is essential to send

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large units across in several echelons over a definite period of time. While one unit is crossing, moving to the new siting area, occupying it and preparing for the launching of missiles, the other one will continue to perform firing tasks in the siting area on the initial bank. The signal for the second unit to cross will be the readiness of the first one to launch missiles. In the interval between crossings of the missile units, the technical and the support and service subunits may be taken across.

In order to take a missile unit of an army missile large unit across, it is adequate to allot a pontoon-bridge battalion ($\frac{1}{2}$ of a TPP) and a platoon of K-61 from the army engineer units. With these means it is possible to take a missile unit across in three trips and, subsequently, also the remaining subunits of the large unit. It is advisable to assemble five ferries with a large surface area and a capacity of 50 tons from one-half of a TPP. In loading equipment on ferries, consideration should be given to its weight and dimensions, and off-center distribution of the load should be avoided. The heaviest equipment must be located in the center of the ferry. Passenger cars, and trucks without trailers will be taken across by a K-61 platoon in three trips.

It is essential to distribute the equipment among trips in such a way that no one trip would contain several vehicles of the same type (launching assemblies, ground carriers, washing down-neutralizing, and other vehicles); and so far as possible the rest of the equipment must be evenly distributed and not exposed to the danger of being put out of action simultaneously by a nuclear burst.

In our opinion, the crossing of the technical subunit should also be done in three trips, observing the above-mentioned conditions for distributing equipment

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among the trips and ferries.

To enable the supply and service subunits to cross in three trips will require the same amount of means as for the missile subunit.

The use of this version will enable a missile large unit to cross in four echelons. The time required for each echelon to cross a water barrier 600 m wide will be 1 hour and 15 minutes; if the water barrier is 1 km wide, it will take 2 hours.

In our opinion the crossing by a missile large unit of water barriers one kilometer to several tens of kilometers in width must be executed by echelons over a broad front, with each echelon composed of a missile or technical subunit. The possibility of using normal landing means and ferries of the TPP and PMP parks decreases as the width of the water barrier increases. In estuaries and in areas of straits, the most acceptable troop crossing means are the powerful self-propelled crossing parks, PPS (pontonnyye perepravochnyye sredstva--pontoon crossing means) or SP-19.

For a crossing by reconnaissance groups and engineer-sapper subunits, it is necessary to have 5 ferries with a large surface area and a cargo capacity of 100 tons each (for heavy engineer vehicles MDK and BAT). Only three such vehicles can be loaded on each ferry, plus 3 or 4 trucks and passenger cars.

For a crossing by a missile unit in one trip, four ferries with a large surface area for 100 tons will be sufficient; and for a technical subunit, three such ferries will be sufficient. Six ferries are needed for the control, supply and service subunits. A total of 22 ferry trips will be required for a crossing by a missile large unit. The principle of preserving

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the maximum independence of units and subunits must be observed here also by distributing the equipment among the ferries.

When a missile large unit is reinforced with a pontoon-bridge battalion having a PPS park, thus bringing into use six ferries with a large surface area and a 100-ton capacity, the crossing can be made in four trips.

The duration of the trip will depend on the width of the water barrier. It will require 35 to 40 minutes just to load and unload the equipment. It is advisable to carry out ferry movements at 15 to 20 minute intervals in order to eliminate the possibility of more than one ferry being destroyed during an enemy nuclear strike.

The crossing by a missile unit of a motorized rifle division will be carried out in echelons on ferries and other landing means directly after the first echelon regiments. This will require 3 trips by the GSP, 8 trips by the TPP with a large surface area, and 11 trips by the K-61.

The success of crossings by missile large units and units depends to a great degree on the efficient organization of the commandant service at the crossing and the exact distribution of vehicles on ferries, and by trips well in advance while the columns are still moving.

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Lt. Colonel V. Dimura
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* * *

The crossing by missile troops over water barriers assumes extremely important significance in a

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modern army offensive operation. In all cases, success is achieved through thorough organization, secrecy of preparations, and the concentration and maneuver of the necessary amount of river crossing means.

Missile units and large units will be able to overcome water barriers very quickly by the skilful selection of sectors; the dispersed location and the timely preparation of crossing points; the creation of alternate and dummy crossings; the coordinated actions of engineer units and the firm control over them, the availability of a reserve of crossing means; and the efficient organization of the commandant and rescue services.

It must be taken into consideration that such crossings will be an advantageous target for the delivery of nuclear/missile strikes by the enemy. In order to achieve speed in crossing, and anti-nuclear protection as well, in our opinion, missile large units and units must be assigned independent crossing sectors. Those points at which forward advancing troops crossed may be under threat of an enemy strike, or they may be occupied by the second echelons and rear services of the army at the moment that the missile units arrive there.

The conclusion suggests itself, that for the crossing of army missile large units and units, special pontoon units have to be allotted, and also, in some cases, other landing-river crossing sub-units that are not connected with the crossing of combined-arms large units. The organization and control for carrying out the crossing must be at the center of attention of the chief of army engineer troops.

The existing organic structure of missile large units and units with their combat equipment of different weights and dimensions greatly complicates

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the organization of crossings. In the practical application of training it becomes necessary to employ all types of crossing means and to search for new designs of ferries which can carry extra-long equipment.

Without examining all aspects of the engineer support of crossings by missile troops over broad water barriers, we would only like to share some practical experience in crossings by an army missile large unit. Brought in for one of the exercises was a pontoon company (with one quarter of a TPP park and two pairs of landing piers), reinforced by a platoon of K-61 amphibious cargo carriers and one tracked self-propelled ferry.

The basic goal of the exercise was to determine the possibilities of crossing by extra-long equipment (saddle cranes and ground carriers) and motor vehicles on 50-ton ferries with large and normal surface areas: extra-long equipment on a 25-ton extra-long ferry; launching assemblies and engineer vehicles (BAT) on a GSP; and motor vehicles weighing less than 5 tons on K-61 amphibious cargo carriers.

The crossing was carried out over the Don River on a sector 450 to 500 m. wide, and extending 7 km along the front. On the basis of engineer reconnaissance data and the availability of crossing means, four crossing points were organized: two [redacted] landing points (three K-61s at one and a GSP at the other) and two ferry points (two 50-ton ferries at one point, one ferry with a large surface area and one with a normal surface area; and a 25-ton extra-long ferry at the other point).

Two hours were spent for reconnaissance, for the preparation of crossing points, and for the organization of the commandant and rescue services.

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In order to achieve a fast and organized crossing, a departure area was selected 3 km from the river. Here the subunits selected were broken up into teams for the crossing. The routes for moving out to the crossing points were marked by colored luminous signs.

We believe that in all cases the departure area should be selected not closer than approximately 3 km from the river, in places that have protective and concealment characteristics and convenient approaches to the water barrier. Despite the short time that the missile subunits are located in the departure area, it must definitely be prepared from an engineer standpoint. Shelters for launching assemblies and missiles should be set up in advance by forces and means allotted from a sapper company of the missile large unit. Upon arrival in the area, the personnel of combat and special vehicle crews excavate the simplest shelters, trenches.

At the exercise the average time of a trip when sending missile equipment across on [redacted] landing means and ferries was: on K-61 amphibious cargo carriers, 10 to 12 minutes; on a GSP, 16 to 17 minutes; on a 25-ton extra-long ferry, 23 to 25 minutes; on a 50-ton ferry with a large surface area carrying motor vehicles weighing over 5 tons, 25 to 27 minutes, and with extra-long equipment, 40 to 45 minutes; and on a 50-ton ferry with a normal surface area carrying motor vehicles weighing over 5 tons, 23 to 25 minutes.

In view of the small amount of equipment (tracked vehicles and small wheeled motor vehicles) that can be taken across on the K-61 and GSP, it seems to us that there is no need to employ the latter. They have little influence in reducing the time it takes a large unit to cross. Thus the GSP was used to take across only eight tracked vehicles, which required two hours; while the K-61s were in use half

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the time it took to get the large unit across. Besides, it should be taken into consideration that during an offensive operation these means will be put into operation to support the forcing of water barriers by the first echelons of the troops.

The experience of exercises convinces us of the advisability of using a 25-ton extra-long ferry instead of a 50-ton ferry with a large surface area for carrying extra-long equipment. The latter holds two extra-long units and takes 55 to 60 minutes to cross a river 450 to 500 m. wide. A good half of this time is spent in loading and centering the equipment, moving the ferry, and unloading. It appears to be much more advantageous to put together two 25-ton extra-long ferries from the components of the 50-ton ferry, plus a small addition of deck panels. In the time it takes the 50-ton ferry to make one trip, these two ferries, because of the greatly simplified loading and unloading of equipment, will each make two trips and will take across four extra-long units. Besides, practice has shown that there is serious danger in having 50-ton ferries with a large surface areas carry extra-long equipment across broad rivers with fast currents and during heavy winds and waves.

It should be noted that the 50-ton ferry with a large surface area (a capacity of 4 to 6 units) can be used efficiently only for carrying launching assemblies and all types of special vehicles. Because of a capacity of 2 or 3 units, a 50-ton ferry with a normal surface area is not very effective for carrying motor vehicles.

Therefore, the 50-ton ferry with a large surface area and the 25-ton extra-long ferry are the most suitable for taking missile equipment across broad water barriers.

The exercise showed that missile equipment can be taken across completely on the above-mentioned

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means at the tempo of an offensive operation. Thus, a missile subunit was taken across on pontoon and other crossing means in two hours.

A study of the experience of tactical-special exercises resulted in the conclusion that, when moving out a missile large unit of operational-tactical missiles to a new axis or to a front line, it will be necessary to allot one pontoon regiment with a TPP park to ensure a crossing by the missile large unit of a water barrier 450 to 500 m. wide. This will make it possible to prepare at least four crossing points, to have six or seven 50-ton ferries with large surface areas and three or four 25-ton extra-long ferries located there, and to take a large unit across in 3 to 3.5 hours.

During a subsequent move of missile subunits from one siting area to another, it is enough to allot a pontoon battalion with half a TPP park. With these forces and means available, it is possible to prepare at least three crossing points with three or four 50-ton ferries with large surface areas and three or four extra-long 25-ton ferries. This will permit each missile subunit to be taken across in 1.5 hours, the technical battery and the large unit command in 2.5 hours, and the remaining subunits within 2 hours. It is true that in this case the crossing means will be in use for a total of 7 to 8 hours, because the crossing of the subunits will be carried out as they approach the crossing points, after fulfilling fire missions in the siting areas occupied earlier.

The setting up of dummy crossings becomes extremely important under modern conditions. We believe that the BAV and K-61 landing-crossing means can be used with the greatest effect for this purpose. The set of dummy wooden missiles (lozhnaya derevyannaya raketa-LDR) that has been introduced into the equipment of the engineer units, plus the

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employment of angular reflectors, permits dummy crossings with a capacity of one missile subunit to be set up in short periods of time. Such crossings are mistaken for real ones by visual and radar observation.

The setting up of a dummy crossing area requires an allotment of a small amount of forces and means. In order to simulate two or three operating crossings it is necessary to have: for a 50-ton ferry, two K-61s and a mock-up of a launching mount; for an extra-long 25-ton ferry, four units of a TPP park, a BMK-90 launch (bystrokhodnyy motornyy kater - high speed motor launch), and a mock-up of a ground carrier.

In order to indicate the movement of missile equipment from the departure area to the dummy crossing points use can be made of a mock-up of a launching mount mounted on special skids and towed by a GAZ-69 (GAZ-63) motor vehicle on a long cable. The simulation of a concentration of missile equipment at the departure area ready for a crossing is done with the remaining part of the mock-ups from the LDR set and with angular reflectors. In our opinion, it is advisable to locate the dummy crossing area for missile equipment at a distance of 8 to 10 km from the main crossing sector. It will also be necessary to detach up to two squads to set up and animate the dummy area.

Lt. Colonel V. Andreyev

Lt. Colonel P. Ryumin

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